

II. Rejection of the Claims In View of the Prior Art

In Item 3 of the Office Action, claims 1-3 and 9 were rejected under 35 U.S.C. Section 103 as being unpatentable over Japanese Reference No. 60-104306 in view of the prior art disclosed on pages 1-3 of the specification. In Item 4 of the Office Action, claims 10-12 were rejected under 35 U.S.C. Section 103 as being unpatentable over U.S. Patent No. 5,005,116 to Fujita et al. taken with European Patent Application No. 299,0852 to Hara (previously cited). For the reasons set forth in detail below, reconsideration of these rejections is respectfully requested.

Japanese Reference 60-104306 discloses an apparatus and method for controlling injection molding by using, as a reference profile, injection molding conditions when good products are obtained. However, the 60-104306 reference is silent as to how to arrive at the injection molding conditions which result in good products. Specifically, the 60-104306 reference does not disclose "adjusting" at least one molding condition to generate an adjusted molding condition, "performing" injection pressure control based on the adjusted molding condition, and "detecting" a pressure acting on the resin during injection pressure control to generate an injection pressure waveform, and "setting" the generated waveform as a target waveform, as recited in claim 1. Further, the 60-104306 reference does not disclose periodically sampling detected pressure and storing the sampled pressures in memory to generate an injection pressure waveform.

The 60-104306 reference discloses that "control is made by taking out any one of holding pressure set values from a holding pressure setter 17 and injection oil pressure, or resin pressure in molds to be detected by the pressure sensor 18...". Further, the Office Action alleges that the 60-104306 reference states "A preset value of a molding conditions set up a setting panel 17 is stored in the controller 16, and indicated on the indicator 2 as the variation characteristics through the indication control part 14 by adding the same to graphing of the foregoing measured value."

Thus, the 60-104306 reference discloses setting a preset value of molding conditions as a target, and modifying the molding conditions by adding a measured value to the preset value. However, the arrangement described in the 60-104306 reference suffers from the drawbacks described on page 6, lines 6-23, of the application specification, wherein the injection pressure waveform is set again from the beginning if a conforming molded article is not obtained. Specifically, the 60-104306 reference sets a preset target value and adds the preset value to a measured value to generate a target waveform. In contrast, according to the presently claimed invention, a target injection pressure waveform is formed by repeatedly adjusting a molding condition, performing injection pressure control, detecting a pressure to generate a waveform, and setting the generated waveform as the target waveform (claim 1) or by repeatedly detecting, sampling and storing pressure (claim 9).

Turning now to the rejection of claims 10-12, Fujita et al. disclose a display to display a graphic step profile of injection speed and injection pressure vs. screw position used in an injection step of an injection molding machine. The display includes means for changing a level of the step profile display picture when an operating condition of the injection molding machine changes. Fujita et al. do not disclose or suggest modifying a waveform by changing a shape of the waveform between designated points of the waveform, as presently recited in claim 10. Fujita et al. only suggest changing a level of a display, and not changing a shape of the waveform between designated points (i.e., points in time).

The Office Action alleges that Hara discloses the claimed changing of the injection pressure waveform between points on the waveform. Hara discloses locally modifying an exponential pressure characteristic curve "pulsewise" to prevent burrs and poor quality of a molded article. Hara discloses a pulse generator which inserts a pulse into a pressure characteristic curve to locally reduce the pressure during a holding step (FIG. 4). The width and amplitude of the pulse may be varied by the pulse generator. Thus,

although Hara discloses modification of an injection pressure waveform, Hara does not store the modified injection pressure waveform. Thus, neither Fujita nor Hara disclose storing a modified injection pressure waveform. Further, Hara does not disclose or suggest designating two points of the injection pressure waveform and changing the injection pressure waveform into a straight line connecting the two points (claim 11). According to Hara, the points of the waveform between which the pulse is inserted (i.e., the modified portion) are not connected by a straight line. Further, Hara does not disclose or suggest modifying the injection pressure waveform by designating three points to designate a curve connecting the three points.

The Office Action asserts that modifying the shape of the injection pressure waveform by changing the waveform portion into a straight line or curved section would have been obvious to one of ordinary skill in the art. It is respectfully submitted that in the absence of any suggestion in the prior art of changing a shape of a designated portion of a pressure waveform into a straight line portion or a curved portion, the Examiner's assertion is based on improper hindsight based on applicant's own teachings.

In view of the above remarks it is respectfully submitted that each of claims 1-3 and 9-12 patentably distinguish over the prior art and define allowable subject matter. Reconsideration of the rejections under Section 103 are respectfully requested.

V. Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that each of the claims distinguish over the prior art and therefore define patentable subject matter. A prompt and favorable reconsideration of the rejection and an indication of allowability of all pending claims are therefore respectfully requested.

Should there be any remaining questions to correct formal matters, it is urged that the Examiner contact the undersigned at his convenience for a telephone interview to expedite and complete prosecution.

If any further fees are required in connection with the filing of this Amendment, please charge same to our Deposit Account No. 19-3935.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8(a)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231

on August 9 1996
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Date: 8/9/96